

REMARKS/ARGUMENTS

The present amendment is in response to the Office Action dated July 30, 2007, where the Examiner has rejected claims 1-25. In the present amendment, claims 1, 12, 15 and 21 have been amended. Accordingly, claims 1-25 are pending in the present application. Reconsideration and allowance of pending claims 1-29 in view of the amendments and the following remarks are respectfully requested.

35 U.S.C. §112

Claims 1-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to comply with the written description requirement. In particular, the Examiner objected to the language “the selection being responsive to a step-counter provided with each butterfly module” as introducing new matter. This language has been deleted in independent claims 1, 12, 15 and 21. However, Applicant respectfully submits that the description and figures describe circuitry which can be referred to as a “step-counter” though that term is not in the specification.

35 U.S.C. §101

Claims 1-25 are rejected under 35 U.S.C. 101 on the grounds that the claimed invention is directed to non-statutory subject matter. Applicant respectfully traverses this ground of rejection.

According to the requirement of section 101, “whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter... may obtain a patent”. With regards to the apparatus claims, Applicant’s claims 1-20 describe a FFT processor which is at least a machine or an article of manufacture and is therefore patentable subject matter.

The Examiner further stated that “there is no cited limitation in the claims that breathes sufficient life and meaning into the preamble so as to limit it to a particular practical application rather than being so broad and sweeping as to cover every substantial practical application of the idea embodied therein”. According to the guidelines of the MPEP the examiner must show “why the claimed invention would impermissibly cover every substantial practical application of, and thereby preempt all use of, an abstract idea, natural phenomenon, or law of nature.” We respectfully submit that no such showing has been made.

In addition, Applicant asserts that independent claim 1 as amended does not have that problem. For example, the FFT processor includes “at least one FFT triplet module having a first, second and third butterfly modules” and a “selectable multiplier” that “is selected in response to a control signal provided with each butterfly module, the control signal comprising a combination of a current and a prior switching signal”. Therefore, the claim does not cover every application of an “idea.”

With regards to the method claims, Applicant’s claims 21-25 satisfy the 101 requirement for method claims because claims 21-25 describe a method of performing an FFT on a data sequence of N samples in an FFT processor having a butterfly module that includes steps of receiving, generating, selectively multiplying, terminating and outputting.

In addition, according to the requirement of section 101, the claim must produce a useful, concrete and tangible result. Applicant asserts that amended claim 21 transforms the input data received by the FFT processor to a useful, concrete and tangible output. For example, amended claim 21 describes obtaining “an FFT of the sequence of N samples; and outputting the FFT of the sequence of N samples.” The outputted FFT of the sequence of N samples is at least useful to compute a discrete Fourier transform (DFT). In particular, the DFT is widely employed in signal processing and related fields to analyze the frequencies contained in a sampled signal. Further Applicant asserts that claims 21-26 are not “broad and sweeping as to cover every substantial practical application.” For example claims 21-26 describe a method for performing an FFT on a data sequence of N samples in an FFT processor having a butterfly module. The process includes receiving a “sequence having N samples” processing the N samples using, for example, “a multiplier for selectively multiplying the generated 2-point FFT sequence,” where the multiplier “is selected in response to a control signal provided with each butterfly module, the control signal comprising a combination of a current and a prior switching signal”.

Accordingly, Applicant requests that the Examiner withdraw this rejection.

35 U.S.C. §102(b)

Claims 1-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Yeh (US Publication No. 2004/0059766; hereinafter “Yeh”). Applicant asserts that Yeh does not

anticipate the amended claims.

For example, independent claim 1 as amended, describes “at least one FFT triplet module having first, second and third butterfly modules connected in series by selectable multipliers for selectively performing trivial coefficient multiplication and complex coefficient multiplication on output data sequences of adjacent butterfly modules,” and, “a selectable multiplier [that] is selected in response to a control signal provided with each butterfly module, [wherein] the control signal [comprises] a combination of a current and a prior switching signal.” Yeh does not describe the above limitations. On the contrary, Yeh describes a central control unit (claim 1, 4th and 5th subparagraphs; also paragraph 0009, paragraph 0011, 606 at figure 10, 706 at figure 12, and 806 at figure 13) which controls each BFI, BFII and BFIII. (See also 36 at figure 3). This is not the same as the claimed “control” implementation of claim 1. Therefore Yeh does not anticipate claim 1.

The “control” implementation of claim 1 can provide important advantages. In certain embodiments of the claimed system, the above limitation including “a selectable multiplier is selected in response to a control signal provided with each butterfly module, the control signal comprising a combination of a current and a prior switching signal”, allows applicant to achieve control implementation that is local to each butterfly module. On the other hand Yeh’s “centralized” solution would have to halt the machine if there were any gaps in timing of provision of any input.

In other embodiments, the limitations that provide local control implementation on each butterfly module can allow applicant to achieve a fully pipelined FFT processor. This application is difficult to achieve in Yeh’s centralized control system due to co-ordination and timing problems requiring further control systems and hardware. Unlike the claimed system and method, Yeh’s centralized control scheme will require each new pipelining arrangement to have a new central controller adapted to provide control signals at the correct times to each butterfly element in the FFT in order for the application to be immune to latency of any butterfly element within the FFT.

Therefore, for the reasons discussed above, it is respectfully submitted that independent claim 1 is not anticipated by Yeh.

Independent Claims 12, 15 and 21

Independent claims 12, 15 and 21 as amended are also presently in condition for allowance for at least similar reasons to those set forth above with respect to independent claim 1.

Dependent Claims 2-11, 13-14, 16-20 and 22-25

Given that dependent claims 2-11, 13-14, 16-20 and 22-25 depend from independent claims 12, 15 and 21, at least for the reasons similar to those discussed above, it is respectfully submitted that claims 2-11, 13-14, 16-20 and 22-25 are not anticipated by the cited references. Withdrawal of the rejections is respectfully requested.

CONCLUSION

For all the foregoing reasons, an early allowance of claims 1-26 pending in the present application is respectfully requested. If necessary, applicant requests, under the provisions of 37 CFR 1.136(a), to extend the period for filing a reply in the above-identified application and to charge the fees for a large entity under 37 CFR 1.17(a). The Director is authorized to charge any additional fee(s) or any underpayment of fee(s) or credit any overpayment(s) to Deposit Account 50-2075.

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Respectfully submitted,


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